

## **Appendix D      Methodology for Identifying PB-HAP Compounds**



This Appendix provides and justifies a list of hazardous air pollutants that have sufficient persistence and bioaccumulation potential to make them candidates for multipathway risk assessments. The list was selected in two stages.

The first stage was to determine which HAPs are already listed as persistent, bioaccumulative, and toxic (PBT) substances by the following EPA programs:

1. Priority PBT Profiles (Pollution Prevention program): <http://www.epa.gov/pbt/cheminfo.htm>.
2. Great Waters Pollutants of Concern:  
<http://www.epa.gov/oar/oaqps/gr8water/3drpt/execsum.html>.
3. Toxics Release Inventory: [http://www.epa.gov/tri/chemical/pbt\\_chem\\_list.htm](http://www.epa.gov/tri/chemical/pbt_chem_list.htm).

All substances that are both HAPs pursuant to the CAA and listed by at least one of these programs are shown in Exhibit 1.

The second stage was to determine if, based on their toxicity and bioaccumulation potential, any additional substances should be assessed for multipathway risk by the air toxics program. This determination was made by calculating two indexes for all HAPs for which data could be obtained. One index (intended to estimate relative carcinogenic potential by oral exposure) was the product of the oral carcinogenic potency slope and the bioconcentration factor (obtained from the EPA PBT Profiler, <http://www.pbtprofiler.net/>). The other index (intended to estimate relative noncarcinogenic hazard by oral exposure) was the ratio of the same bioconcentration factor to the oral reference dose. The cancer and noncancer indexes were normalized to a scale of 1 and combined by averaging (with chemicals with no data not averaged, rather than averaged as zero).

The HAPs were then ranked in descending order of the combined index, and the substances that comprised 99.9999% of the total of all substances were selected as potential candidates for multipathway risk assessment. Results of the ranking exercise are shown in Exhibit 1.

Of the 26 substances that comprised 99.9999% of the aggregate index for all HAPs, 19 are classified as polycyclic organic matter under the Clean Air Act. These were combined into a single category in the table. Metals could not be ranked because the PBT Profiler does not contain data for inorganic pollutants, but were included in the table because of their presence on the other lists. Three other substances shown as “NA” fell outside the 99.9999% aggregate limit.

In summary, no substance not already on at least one existing list emerged in this analysis as a significant potential PBT substance. Therefore, based on our current estimates of toxicity and bioaccumulation potential, the 14 substances in the table represent a conservative list for multipathway risk assessments in the air toxics program.

Exhibit 1. Identity and Ranking of Potential PB-HAP Compounds				
PB-HAP Compound	OAQPS Rank	Pollution Prevention Priority PBTs	Great Waters Pollutants of Concern	TRI PBT Chemicals
Cadmium compounds	NA <sup>(1)</sup>		X	
Chlordane	7	X	X	X
Chlorinated dibenzodioxins and furans	1	X <sup>(2)</sup>	X	X <sup>(3)</sup>
DDE	8	X	X	
Heptachlor	4			X
Hexachlorobenzene	6	X	X	X
Hexachlorocyclohexane (all isomers)	NA <sup>(4)</sup>		X	
Lead compounds	NA <sup>(1)</sup>	X <sup>(5)</sup>	X	X
Mercury compounds	NA <sup>(1)</sup>	X	X	X
Methoxychlor	NA <sup>(4)</sup>			X
Polychlorinated biphenyls	3	X	X	X
Polycyclic organic matter	2 <sup>(6)</sup>	X <sup>(7)</sup>	X	X <sup>(8)</sup>
Toxaphene	5	X	X	X
Trifluralin	NA <sup>(4)</sup>			X
<p>(1) Not ranked because the PBT Profiler lacks data for inorganic compounds</p> <p>(2) “Dioxins and furans” (denotes the phraseology of the source list)</p> <p>(3) “Dioxin and dioxin-like compounds”</p> <p>(4) Did not fall within 99.9999% of cumulative index</p> <p>(5) Alkyl lead</p> <p>(6) 19 POM compounds that fell within the top 26 substances were assigned the rank of 7,12-dimethylbenz(a)anthracene, the highest-ranked compound</p> <p>(7) Benzo[a]pyrene</p> <p>(8) “Polycyclic aromatic compounds” and benzo[g,h,i]perylene</p>				